

### Remarks

Claims 36-61 and 63-73 are allowed and remain pending. In an inquiry with the Examiner, we have confirmed that Claim 62 is previously cancelled without prejudice. In an inquiry with the Examiner, we have confirmed that Claim 73 is allowed and remains pending. Claims 1-35 are previously presented and remain pending.

### Claims Rejections-35 USC 103(a)

Applicants traverse Examiner's rejection of claims 1, 2, 4 and 11 per 35 USC §103(a) as being unpatentable over Sugiyama *et al.* (US Patent 6,075,253) in view of Khan *et al.* (US-Patent Application 2003/0176075) further in view of West *et al.* (US-Patent Application 2005/0053347). Sugiyama *et al.* does not disclose or suggest using:

“a waveguide comprising:

a core comprised of a germanium on silicon heterojunction stack comprising:

a silicon layer comprising substantially silicon for conducting light, and

a germanium layer comprising substantially germanium for conducting light;”

as required by the current invention and claimed in Claim 1 and in Claims 2, 4 and 11, which are dependent on Claim 1. A waveguide, as required by the current invention, necessarily confines and guides light. In the current invention, the waveguide guides light through both the silicon and germanium layers. In contrast, Sugiyama *et al.* makes no mention of a waveguide for guiding light and instead relies on illumination from above the photodiode structure to introduce light into a photodiode. Furthermore, the current invention requires:

“a first plurality of conductive contacts coupled to said germanium layer, and

a second plurality of conductive contacts coupled to said silicon layer.”

These contacts and their positions are critical to the operation of the current invention. As noted by the Examiner, Sugiyama *et al.* does not explicitly disclose the position or existence of any electrodes.

Examiner cites the structure disclosed in Figure 6 of Sugiyama *et al.* and describes “a buried silicon layer 2 for conducting light, a germanium layer 7 for conducting light”. Figure 6 requires the presence of a p-type GaAs layer 13 disposed between a p-type silicon layer 10 and a photoabsorptive layer 8. The current invention does not require GaAs material for operation. Furthermore, Applicants respectfully submit that Figure 7A and Figure 7B from Sugiyama *et al.* illustrate that in operation, these layers are not “for conducting light” as stated by the Examiner. Note the significant light absorption that has taken place in the layers above buried silicon layer 2 and germanium layer 7.

Applicants traverse Examiner’s rejection of claims 1, 2, 4 and 11 per 35 USC §103(a) as being unpatentable over Sugiyama *et al.* (US Patent 6,075,253) in view of Khan *et al.* (US-Patent Application 2003/0176075) further in view of West *et al.* (US-Patent Application 2005/0053347). Khan discloses techniques for etching silicon-germanium alloys. However, according to the current invention does not require or disclose the use of silicon-germanium alloys. The requirement of “a germanium on silicon heterojunction stack” is an essential limitation of the current invention. By definition, a silicon germanium heterojunction may contain a layer of silicon and a layer of germanium; each layer has a different characteristic band-gap giving rise to differing electrical properties and no mention of silicon-germanium alloys is made. In Claim 1, an essential limitation of the current invention is expressed:

“a heterojunction stack comprising:

a silicon layer comprising substantially silicon for conducting light, and  
a germanium layer comprising substantially germanium for conducting light;”

The current invention does not address alloy structures; Khan *et al.* does not address stacks of substantially pure silicon and substantially pure germanium. Furthermore, Khan does not disclose detector structures or contact structures.

Applicants traverse Examiner’s rejection of claims 1, 2, 4 and 11 per 35 USC §103(a) as being unpatentable over Sugiyama *et al.* (US Patent 6,075,253) in view of Khan *et al.* (US-Patent Application 2003/0176075) further in view of West *et al.* (US-Patent Application 2005/0053347). Applicants respectfully claim that the current invention has priority over West. The current application was filed on June 19, 2003 and claims priority to a set of four provisional application. The priority dates associated with the provisional applications are:

US Provisional Application Number 60/389,962 was filed on June 19, 2002;  
US Provisional Application Number 60/391,277 was filed June 24, 2002;  
US Provisional Application Number 60/432,925 was filed December 12, 2002; and,  
US Provisional Application Number 60/433,470 was filed December 13, 2002.

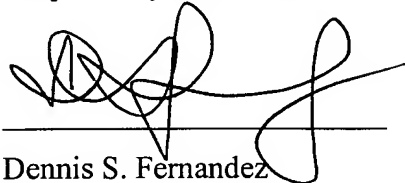
The Examiner cites West et al. (US-Patent Application 2005/0053347) with a filing date of May 28, 2004. West claims priority based on a US Provisional Application Number 60/474,155 filed on May 29, 2003. In this example, the current application has an earlier filing date.

Although the West claim of priority based on the provisional applications is earlier than the Applicant's filing date, Applicants established an earlier claim to priority based on provisional applications. For example, Applicant's US Provisional Application Number 60/433,470 was filed December 13, 2002 and predates the West filing date (May 28, 2004) and the filing date of West's Provisional Application Number 60/474,155 filed on May 29, 2003. Examiner cites West's Figure 4J: "a plurality of contacts 426 are coupled to two separate layers". On page 4 of Applicant's earlier US Provisional Application Number 60/433,470, an illustration discloses contacts to two separate layers. In the example illustrated on page 4 of Applicant's US Provisional Application Number 60/433,470, a contact is established over a germanium n or p region and a second contact is established over an active silicon p or n region.

In view of the foregoing Remarks, it is respectfully submitted by Applicants that all claims are now in condition for allowance. Reconsideration of the rejections is requested, and allowance of the claims at an early date is solicited. No additional fees are required by this paper. If the Examiner has any questions, kindly direct any such queries to the following phone number or email address.

Applicants respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Dennis S. Fernandez', written over a horizontal line.

Dennis S. Fernandez

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